JAPAN. No. 2 (1882).

31

REPORT

BY

HER MAJESTY'S ACTING CONSUL AT HAKODATE

ON THE

LACQUER INDUSTRY OF JAPAN.

Presented to both Houses of Parliament by Command of Her Majesty.
August 1882.

LONDON:
PRINTED BY HARRISON AND SONS.

1882.

[The Specimens alluded to in this Report are exhibited in No. 1 Museum, in the Royal Gardens at Kew.]

Report by Her Majesty's Acting Consul at Hakodate on the Lacquer Industry of Japan.

Tôkiô, January 13, 1882.

THE following Report is intended chiefly as a description of the articles of various kinds illustrative of the lacquer industry of Japan, collected for the use of the Museum of Economic Botany at Kew, under instructions from Her Majesty's Chargé d'Affaires at Tôkiô.

While preparing it, it was found that a number of Japanese terms had to be employed, which without a somewhat detailed explanation would be unintelligible to any one not acquainted with the Japanese language and not familiar with the technicalities of the lacquer trade. A short description of the various processes through which lacquer passes, from the planting of the tree to the completion of the decoration in various styles, has therefore been given, but all historical and other details not specially called for have been omitted.

I have considered it advisable to make each step a progressive one, detailing the various processes as nearly as possible in the order in which they follow each other in actual practice, together with the materials and implements employed.

Thus, after describing the cultivation of the lacquer tree, a list of the tools used for tapping is given, followed by a description of the method pursued by the tappers, and so on.

The headings under which the subject-matter divides itself are as follows:—

1. Cultivation of the lacquer tree.
2. Tools used in tapping.
3. Mode of tapping and treating the tree.
4. Various woods used in making lacquer ware.
5. Various kinds of lacquer and mixtures used—

   (*a.*) For plain work.
   (*b.*) For lacquering with gold.

6. Implements and materials used in the manufacture of plain lacquer.
7. Mode of applying the lacquer in making—

   (*a.*) *Hon-ji* (real basis).
   (*b.*) *Kata-ji* (hard basis).
   (*c.*) *Han-dan-ji* (half-step basis).
   (*d.*) *Manzo*, so called after a lacquer worker of that name.
   (*e.*) *Ka-no-ji* (inferior basis).
   (*f.*) *Shibu-ji* (Persimmon)—(juice basis).
   (*g.*) *Sabi-sabi* (double sabi).
   (*h.*) *Kaki-awase* (mixture), or *Kuro-shunkei* (black Shunkei), from the name of its inventor.
   (*i.*) *Aka-shunkei* (red Shunkei).
   (*j.*) *Kijiro* (colour of the grain of wood).
   (*k.*) *Red* and *coloured* lacquers.

8. Tools and materials used in the manufacture of gold lacquer.
9. Mode of making gold lacquer—
   - (a.) *Togi-dashi* (bringing out by grinding).
   - (b.) *Hira-makiye* (flat gold lacquer).
   - (c.) *Taka-makiye* (raised gold lacquer).
   - (d.) Lacquering on metal.

Accompanying these notes is a short paper on the subject of lacquer, read at a meeting of the Asiatic Society of Japan on the 12th October, 1880, which may prove of some interest, as containing a few historical and other details here left unmentioned.

The present investigations have shown that certain statements therein made must be modified, so that where the description of any process differs—especially that relating to the tapping of the trees—the present paper must be taken as the correct one.

Great difficulty has been experienced in obtaining thoroughly reliable information, as not only are the artificers, for the most part, uneducated, but they are entirely ignorant of what takes place in any other department except that to which they have been brought up. A well-known and most intelligent manufacturer, Takei Tōsuke, who has been over twenty years himself a worker in gold lacquer, and from whom great assistance has been derived in bringing together the present collection, was quite unaware of the mode of tapping and treating the trees, and had never even seen a cut specimen of the wood until the pieces now forwarded were procured. He states that his head workman, a highly-skilled artisan over 50 years of age, hardly knows the name of a single article that he uses. Having, however, communicated direct with the persons who conduct the several branches, it is hoped the following pages will contain no inaccuracies.

The *Rhus vernicifera*, the well-known lacquer tree of Japan, is met with all over the main island, and also in smaller quantities in Kiushiu and Shikoku, but it is from Tōkiō northwards that it principally flourishes, growing freely on mountains as well as in the plains, thus indicating that a moderate climate suits the tree better than a very warm one. Since early days the cultivation of the tree has been encouraged by the Government, and as the lacquer industry increased plantations were made in every province and district. The lacquer tree can be propagated by seed sown at the end of January or the beginning of February. The first year the seedlings reach a height of from 10 inches to 1 foot. The following spring the young trees are transplanted about 6 feet apart, and in ten years an average tree should be 10 feet high, the diameter of its trunk 2½ to 3 inches, and its yield of lacquer sufficient to fill a 3-ounce bottle.

A more speedy method is, however, generally adopted. The roots of a vigorous young tree are taken, and pieces 6 inches long and the thickness of a finger are planted out in a slanting direction a few inches apart, 1 inch being left exposed above the ground. This takes place in the end of February and through March, according to the climate of the locality. These cuttings throw a strong shoot of from 18 to 20 inches the first year, and are likewise planted out the following spring. Under equally favourable circumstances these trees would in ten years be nearly 25 per cent. larger in girth, some 2 or 3 feet higher, and would yield nearly half as much more sap than the trees raised from seed.

It has not hitherto been the custom to bestow any special care on the trees after planting them out, but in cases where leaf or other manure has been applied they are much finer. Of late years hill sides and waste grounds alone have been used for lacquer plantations, as, owing to the rise in the price of cereals and farm produce generally, it does not pay the farmers

to have their land cumbered with trees. Those that have been hitherto planted along the borders of the fields are being rapidly used and uprooted, and, where practicable, mulberry trees are planted instead, with a view to rearing silkworms. Nevertheless, as a good workman is expected during the season to tap an average of 1,000 trees ten years old, and as the Province of Yechizen alone sends out about 1,500 "tappers" yearly to the various lacquer districts, it will be seen that an immense production annually takes place, stimulated, doubtless, by the demand for cheap lacquered articles abroad.

It should also be mentioned that to remedy the possible exhaustion of the supply, and in view of the great rise which has taken place in the price of lacquer, several Companies are being projected to plant waste lands with the tree. A ten-year-old tree, which some five years ago only cost from 1 to 2 sen, now costs 10 sen, which, allowing even for the depreciation in the value of the paper currency, shows a rise of about 500 per cent.

The best transparent lacquer comes from the districts of Tsugaru, Nambu, Akita, and Aidzu. It is largely used by the workers of Kioto, Osaka, and the southern provinces, but though also used in Tôkiô is not so much appreciated there as the lacquer produced from the neighbourhood of Chichibu in the Province of Mus-ashi, from Nikko in Shimotsuke, and that produced in the Provinces of Kôdzuke and Sagami, which hardens more rapidly, and is best for black lacquer.

There are some districts the lacquer obtained from which is best for certain kinds of work, but is not so well adapted for others. The kind which is used for transparent lacquer is mixed in large tubs, to insure a uniform quality, and being allowed to stand for some time (say, a week or ten days), the best portion, which is ordinarily 70 per cent. of the whole, is skimmed off. This is used for *Nashiji* and *Shu* lacquer, while the remainder is used for making inferior mixtures, such as *Jôhana*, &c., all described elsewhere. Almost all the various classes of lacquer are similarly dealt with to insure uniformity, as some qualities dry much quicker and are better than others, and the slow-drying qualities would otherwise remain unsold.

The whole country produces at present on an average from 30,000 to 35,000 tubs per annum, each tub being of about four gallons capacity. Some 70 to 80 per cent. of this total amount is produced from Tôkiô northwards. Nearly one-half of the lacquer produced is sent to the Osaka market, where it is prepared as required and resold all over the western and southern provinces, the remaining portion being used up locally and in Tôkiô.

The usual age at which a tree is tapped is ten years, but in some few cases a tree is tapped when only three or four years old. The best lacquer for transparent varnish is obtained from trees from one to two hundred years old, as their sap has more body, and is more glutinous. The tools used in obtaining the lacquer are as follows:—

Kawa-muki (bark parer), a curved knife with which the workman smoothes all inequalities of the bark before tapping the tree.

Yeda-gama (branch sickle), an instrument with a gouge on one side and a knife on the other, fitted with a piece of bamboo to give the hand a good hold when tapping branches.

Kaki-gama (scraping sickle), a similar instrument, without the piece of bamboo used for tapping trees generally.

Yeguri (a gouge), used in autumn to scrape the bark smooth before giving the final cut with the *kaki-gama*.

Natsu-bera (summer spatula), used for scraping the sap out of the incisions into the receptacle named *gô*.

Hōchō (knife), used for cutting the bark of branches in obtaining *seshime* or branch lacquer.

Seshime-bera (seshime spatula), used for collecting the sap which exudes from the incisions in the bark of the branches.

Gō, the bamboo or wooden pot, in which the sap is put as it is collected.

Gō-guri (pot gouge), a long straight knife for scraping the lacquer out of the pot into the tub.

Te-bukuro (glove), worn by the tapper to protect his hand from contact with the sap.

The first tapping takes place about the beginning of June. The standard number of trees allotted to a tapper for the season is 1,000—presuming them to be about ten years old (the size of the small specimen), about 800 of the size of the large specimen, and so on, less and less according to the size of the trees. Having cleared away the grass from the roots, the workman makes the round of his allotted trees, marking each with small notches about half an inch long. The first of these notches is made about six inches from the bottom of the tree on the right-hand side; the next, one "hand stretch" higher up on the left-hand side; the next, one "hand stretch" higher on the right, and so on, alternately as far as the workman can reach. These preliminary markings, which are to determine all the places for subsequent tapping, take fully four days, being at the rate of 250 trees a-day. The tapper then goes round, provided with the bark scraper, the ordinary scraping sickle, the summer spatula, and the pot to hold the lacquer, and first smoothing the bark where required gives one cut above and one cut below the two lower marks, and one cut above the remainder of the other marks, the cut being in each case about an inch and a-half long. After giving the cut the instrument is reversed, and the knife is run along the incision to insure the bark being entirely cut through. This process is repeated every four days, each incision being made a little longer than the preceding one, up to the fifth tapping, inclusive, after which the remaining incisions are made of the same length. At each round, when all the requisite incisions have been made on the tree, the workman gathers the sap which has exuded with the spatula, beginning with the two lowest incisions, and so on to the uppermost cut. Twenty-five is considered the normal number of cuts, which, at the rate of one incision at each place every four days, occupy 100 working days, and allowing for some twenty days of rain during which the sap cannot be drawn, the season is brought to a close by the end of September. If the workman has any large trees to tap, the whole of which he cannot reach when making his ordinary rounds, he taps all he can reach, and when his round is concluded he returns with a ladder, and mounting each tree taps the remainder of the trunk and the leading limbs in the same manner as above described, previous to making a fresh round.

When the full number of incisions has been given, the workman gives an extra long cut underneath all the initial notches on each tree to obtain the sap which has collected there, and another above the uppermost cut of each set. These incisions are called *Ura-me* (back marks). The workman also makes a number of cuts, each about a foot apart, in all the branches whose diameter exceeds one inch. This operation requires about sixteen days to get through the whole number of trees. The next operation is called *Tomé* (the finish). This consists in a number of incisions completely encircling the tree wherever the workman perceives a likely place. The next process consists in cutting off all the branches; the larger ones are once more tapped after being cut off to extract any sap that may still remain in them, and the small branches which have not



yet been tapped are tied in bundles and steeped in water for about ten days. When taken out and dried the bark is cut with a knife, and the sap which exudes is collected with the branch spatula, and is called *Seshime* lacquer. This word seems to be derived from *Sehi*, the name of a machine, and *shimeru* (to press), from a practice which obtained in olden days of pressing the branches in such a machine to obtain the sap. It is also known as *Yeda urushi*, or branch lacquer, which latter more explicit term is, for the sake of convenience, used throughout this Report.

The sap obtained from the first five cuts above each notch is poor, containing, as it does, a large proportion of water; the middle fifteen cuts produce the best sap, and the sap obtained from the last five incisions is poor, and lacks consistency. Again, the sap obtained from the *Ura-me* (back marks) and *Tomé* (finishing) cuts is very good, and dries quickly.

The sap from the first twenty-five cuts is mixed and sold together, but the *Ura-me* and *Tomé* sap is almost always mixed and sold separately. The operations above described kills the tree in one season, but frequently the tree is made to last two years or more, by giving only half the number of incisions, and reserving the *Ura-me* and *Tomé* cuts for the final year. The sap obtained the second and following years is, however, of an inferior quality, and this method is only resorted to by private individuals, who tap their own trees during the intervals of farming. Ordinarily, a wholesale dealer in lacquer buys so many thousand trees from the owner, and, as a matter of course, extracts the sap with as little delay as possible, making a contract for the purpose with professional tappers. A first-rate workman will receive over 100 yen (equal, at the present low rate of exchange, to nearly 13*l.* sterling) for the season, and can collect four-and-a-half tubs (equivalent to eighteen gallons), but the average receive 75 yen, and collect proportionately less. The present price per tub of lacquer ranges from 90 to 100 yen.

After the sap has been taken the exhausted tree, which remains the property of the seller, is cut down by him, and is used for firewood, for building purposes, or for making boxes. The roots of the young trees throw from three to five shoots the following spring, and these can be used in six or seven years. Of these five sprouts three are commonly much stronger than the other two. In such cases, the strong ones only are tapped and cut down, the weaker ones being allowed a year or two longer to grow, when, receiving the whole of the nutriment, they shoot up in one year as much as an ordinary tree would in three. After tapping and cutting down fresh shoots to the number of five are again allowed to sprout, and so on, the root not seeming to become exhausted by the process; but when a very old tree is cut down the root will not give out new shoots. In the northern provinces very old and large trees are met with in considerable quantities. These were kept for the sake of their berries, from which the wax used for the Japanese candles were obtained. This was the more profitable use to which to put the tree, as a good tree, from 60 to 100 years old, yielded yearly, on an average, equal to 6*s.*, while the price of a ten-year-old tree to be used for extracting the sap was under 1*d.* Previous to the Revolution of 1868 every tree reserved for making wax was officially registered, and the owner was not allowed to mutilate it in any way. Even if a tree died, he had to get official permission before removing the stump. The Shōgun's Government and also the local magnates had large plantations of the lacquer tree reserved for wax, but since the opening of the country to foreign trade, and the introduction from abroad of kerosene oil, the wax industry has greatly declined, and there are now no restrictions on the free sale of the tree for tapping, and, consequently, all the fine old trees (which will sell for from 5 to 6 yen each) are fast disappearing.

To show the relative value of the berries and the trees a few years ago the following may be cited:—A wholesale lacquer merchant informed me that five or six years ago he went as usual to purchase trees in the district of Aidzu, and among others bought one tree for a yen (then equal to 4s.), the owner reserving the berries that might be got as his own property. He does not consider the bargain was a cheap one, but the owner realized the sum of 80 sen (equal to 3s. 2d.) from that year's yield of the berries alone before cutting down the tree.

It should be mentioned that the above description of the method pursued in tapping the lacquer tree is that which is recognized as the proper one; but, as even the specimens of the lacquer tree forwarded will show, the rule is not rigidly observed, the style and size of the tree, and the caprice of the workman, combining to cause variations in the number of incisions given in each series.

Various Woods used in making Lacquer Ware.

The woods chosen for lacquering on are naturally selected according to the use to which the lacquered article is to be put. For shelves, cabinets, and boxes of all kinds, the following are principally used, and are set down in the order of their excellence:—

Hinoki (*Chamæcyparis obtusa*).—This is by far the best wood for making boxes, as it does not warp.

Kiri (*Paulownia imperialis*).—A light wood, used for clothes boxes, which are only lacquered on the outside. It is also used for making tea-caddies, as the wood has no smell.

Hono-ki (*Magnolia hypolema*).—All sword sheaths have hitherto been made of this wood.

Sawara (*Chamæcyparis pisifera*).—This is a wood of a coarser grain than *Hinoki* (*Ch. obtusa*).

Hime-ko-matsu.—This wood is used for carved figures of men, animals, &c. It is not liable to split and crack.

Tsuga (*Abies tsuga*).

Hiba (*Thujopsis dolabrata*).—Used for making cheap articles.

Akamatsu (*Pinus densiflora*).

Sugi (*Cryptomeria japonica*).—This wood is only used in making the cheapest and most inferior goods.

The following woods are mostly used in the manufacture of such articles as are turned in a lathe, as bowls, rice cups, round trays, &c.:

Keyaki (*Planera japonica*), the best being obtained from the Province of Hiuga.

Shoji.

Sakura (*Prunus pseudo-Cerasus*).

Katsura (*Cercidiphyllum japonicum*).

Tchō (*Ginko biloba*).

I-go.—Grown in large quantities in the neighbourhood of Hakone. It is principally used in the manufacture of toys and cheap articles.

Buna.—Principally used in the district of Aidzu for the same kind of utensils as *Keyaki* and *Sakura*, but being a brittle wood, it cannot be turned in a lathe to make such fine articles; those made of this wood are coarser and heavier. For raised gold lacquering over the unvarnished surface, the following hard ornamental woods are often used:—

Shitan.

Tagayasan.

Karin (quince).

Kuwa (mulberry).

Keyaki (*Planera japonica*).—Ornamental grain.

Various Kinds of Lacquer and Mixtures used.

(a.) *For Plain Work.*

Ki-urushi (crude lacquer) is the generic name by which all lacquer obtained from the trunks of live trees is known. It forms the basis of nearly all the various mixtures used in making lacquer ware.

Seshime (branch lacquer).—This kind is obtained from the branches of the trees, as described above; but the yield is only about 1 per cent. in comparison with other lacquer. As, however, in working the proportion of nearly 90 per cent. is required, the lacquer manufacturers sell a mixture, which is stated to be a compound of true branch lacquer, the best crude lacquer, *Ura-me* and *Tomé* lacquer, *funori* (seaweed jelly), sweet potatoes grated fine, the whole coloured, as may be necessary, with soot. The proportions in which these materials are used cannot be ascertained, and, indeed, each manufacturer uses his own special mixture, but the extraneous additions are believed not to injure the quality of the whole.

True branch lacquer becomes extremely hard when once dry, but used alone will not dry under some twenty days, so that now, when time is an object, the pure sap is but little used. Previous to the Revolution of 1868 branch lacquer of a very superior quality, and which would dry quickly, was obtained by using the young shoots which sprouted yearly from the roots after the trees had been cut down. This kind was called *Ki-seshime* (crude branch lacquer), and was made under directions from the Government, who received it as taxes; but the practice has been discontinued of late. The price of pure branch lacquer is—owing to the difficulty in drying—only 70 per cent. of ordinary good lacquer.

Rō-urushi (black lacquer).—This is made by adding to crude or branch lacquer about 5 per cent. of the tooth-dye used by women (*Haguro*), a liquor formed by boiling iron filings in rice vinegar, and exposing it to the sun for several days, stirring the mixture frequently till it becomes a deep black.

In preparing all lacquer—from the crude lacquer to the various mixtures—the principal object is to get rid of the water that exudes from the tree with the sap. To effect this, it is exposed in broad flat wooden dishes, and stirred in the sun. This, however, alone will not cause the original water to evaporate, so from time to time—ordinarily about three times in the day—a small portion of clean water is stirred in, say, 1 per cent. each time, for a couple or three days, according to the heat of the sun. All the water then evaporates together. No lacquer will dry until this process has been gone through. If the lacquer is old, *i.e.*, has been tapped a long time before using, it is much more difficult to dry. In such cases a portion of fresh lacquer is added to the old by the wholesale dealers, or else the manufacturers, instead of water, sometimes mix *saké* (rice beer) or alcohol, to "quicken" it.

A very remarkable property of lacquer should be mentioned. If crude lacquer, which is originally of the colour and consistency of cream, is exposed to the sun for a few days without adding water, it loses its creamy colour, and becomes quite black, or nearly so, but also becomes thinner and transparent, or rather translucent, as can be seen when it is smeared on a white board. It will not now, however, dry if applied to an article, even if kept a month or more in the damp press. But if water is mixed with the lacquer which has thus been exposed and become black it at once loses the black colour and its transparency, and becomes again of a creamy colour, though slightly darker, as if some coffee had been added, than at first. After evaporating this water, it can then be used like any ordinary lacquer, either alone or in mixtures, and will dry in the damp

press, during which process it again turns black. What lacquer workers have found their greatest stumbling-block is the difficulty of obtaining a clear transparent varnish. What is called transparent varnish is really black to the eye, and requires grinding and polishing after application before it presents a brilliant surface, becoming also much lighter after a little time. It would be a new era in the manufacture of lacquer ware if a method could be discovered of rendering the lacquer varnish perfectly clear and light coloured when so desired, without depriving it of its drying qualities, and also if colours could be used with it other than those hereafter mentioned.

Nakanuri-urushi (middle painting varnish).—This is merely the crude lacquer. After having been exposed for some time to the sun to darken it and to get rid of all water, it is used for under-coats in making first-class lacquer ware.

Nuritate-urushi (finishing lacquer).—This is a mixture of crude lacquer and a little turpentine with *Tō-midzu* (whetstone water)—being the mixture obtained from whetstones on which blades have been sharpened. In it there is some 7 to 8 per cent. of iron, and after mixing the whole is exposed to the sun, both for the purpose of getting rid of all the water and to darken the colour. This is used for final coats of cheap lacquer, which is not polished afterwards.

Jō-hana-urushi.—This is a mixture of the above kind, with oil obtained from the *Ye* plant (*Perilla ocymoides*). This is used for still more common kinds, requiring no after polishing, and the lacquer does not present a hard surface.

Jō-chiu, called in Kioto *Chiu-hana*; *Jō-tame*, called in Kioto *Ge-hana*.

These contain more and more oil, and are used for the commonest articles, such as for varnishing clogs, clothes baskets, &c. These three last kinds give a high polish, but the lacquer does not last.

Shu-urushi (vermilion lacquer).—This is the best crude or transparent varnish mixed with *Ye* oil (*Perilla ocymoides*), sometimes as much as 50 per cent. being added. It is then exposed to the sun and water added, which is afterwards evaporated. This kind is only used for red (whence its name) and coloured lacquers, the colours being added at the time of application. It requires no after polishing.

(*b*.) *For Lacquering with Gold.*

Nashiji-urushi (pear basis lacquer), or *Suki-urushi* (transparent lacquer).—The first name is that best known in the trade, as indicating that it is required for using over gold, silver, or tin powdering. It consists of the finest crude lacquer obtained from old trees. As stated previously, the lacquer is allowed to stand till all dirt and foreign matter has sunk to the bottom, when the best is skimmed off, and after being exposed to the sun to evaporate the water in the usual manner, and carefully filtered, it is ready for use. Except when used for the highest class of gold powdering, a certain proportion of gamboge is mixed with the lacquer to give the dust a fine yellow colour.

N.B.—The above ten kinds are all bought by the lacquer workers ready prepared from the manufacturers. Any further mixtures used by them are made as required, colours added, &c.

Seshime-urushi (branch lacquer) and *Rō-urushi* are used also in making gold lacquer.

Yoshino-urushi.—This is crude lacquer from the district of Yoshino in the Province of Yamato. It dries quickly, and closely resembles transparent varnish. It is used when giving the final coats before polishing.

Yoshino-nobe-urushi (Yoshino spreading lacquer).—Same as above, with the addition of about one-third of camphor to render the lacquer thinner and more easy to spread.

Seshime-nobe-urushi (spreading branch lacquer). — This is merely branch lacquer with the same proportion of camphor as above when cheap work is required; more camphor is used till the proportions are reversed. This renders the mixture very soft, and a small quantity can be spread over a large surface.

Shita-maki-urushi (under coat lacquer).—A mixture of branch lacquer and *Benigara* (red oxide of iron) in equal parts by weight.

Ke-uchi-urushi (inside line lacquer).—This is the same as above, but it is allowed to stand for about six months after mixing before it is used. By this time it has got thicker, and the very finest lines can be drawn without fear of their running, and they moreover stand out better.

Shita-maki-nobe-urushi (under coat spreading lacquer).—Same composition as above, with the addition of a little camphor to make the lacquer thin. It thus goes much farther, and causes a great saving when lacquering with powdered gold-leaf (*keshi-fun*), for which it is best suited. As in the other mixtures, the more camphor is used the thinner it renders the lacquer, and the less gold is required.

Taka-maki-urushi (raised lacquer).—To make this a certain quantity of *Rō* or *Nuritate* is taken and divided into three parts. To one part is added lampblack and camphor in equal portions of bulk. These, after being well mixed, are boiled together; then the other two portions are added, and the whole stirred together, and afterwards filtered through paper. It is boiled more or less according to the season. In summer, when lacquer dries quickly, it is boiled for a longer period, while in winter, or during cold weather, when lacquer naturally takes longer to dry, the mixture is boiled for a shorter time. The reason why *Takamaki* is thus purposely rendered soft is explained by the fact that otherwise the upper surface would harden at once, while the under portion (*Takamaki* being applied thickly), being excluded from the upper air, would not be able to dry, and later the top surface would crack and show fissures, whereas the introduction of camphor renders it soft and much slower to dry, and the whole has thus time to harden equally. Camphor being volatile is gradually lost, and the composition becomes quite hard.

Ro-se-urushi (a mixture of black and branch lacquer).—This is used for the lacquer coating upon which gold, silver, or tin powder is scattered, except in such cases when the grain of the wood is to be shown, when *nashiji* lacquer is used instead.

Kuma-urushi (shading lacquer).— A mixture of *Johana* lacquer and lampblack, used for final shading in the feathers of birds or animals, or for drawing hair, &c., on flat and raised gold lacquer.

It should be noted that whenever lampblack is mentioned as a mixture it is used for the superior kinds, wood or coal soot being used for inferior articles.

Implements and Materials used in the Manufacture of Plain Lacquered Ware.

Herā.—A spatula made of *Hinoki* (*Chamæcyparis obtusa*), used for applying the under or priming coats and for mixing the lacquer.

Haké.—A flat brush made from human hair, used for laying on the lacquer.

Kokuso.—Finely chopped hemp. Mixed with lacquer it is used for covering joints.

Nuno.—Hempen cloth, used for pasting over the wood to prevent it

splitting and to strengthen corners, &c. For very fine work and small articles silk is used.

Ji-no-ko (burnt clay).—Afterwards reduced to a very fine powder. Pounded bricks are often used.

To-no-ko.—A fine kind of clay, which is procured from Mount Mari, near Kioto. This is likewise burnt, and reduced to a fine powder.

Sumi.—Charcoal made of *Hōnoki* (*Magnolia hypoleuca*), used for smoothing down the under coats; it has rather a rough grain. Also charcoal made from *Hiyakujikkō* (*Largerstramia indica*). This is very soft and of a fine grain, and is used for the final smoothing before hand polishing. This kind is called by the trade *Rō-iro-sumi* (black coloured charcoal).

To-ishi.—Whetstones of four different qualities of fineness: *Ara-to* (rough), *shiro-to* (white), *awo-to* (green), and *nagura*, the last being the finest. These are used for smoothing down the priming coats.

Tsuno-ko (horn powder).—This is made of calcined deer's-horns, reduced to a fine powder, and is used for the final polishing with the finger.

To-kusa equisetum.—A kind of scouring rush, used for smoothing the lacquer.

Kaki-no-shibu (Persimmon juice).—This is used when no ground lacquer is required, as in the Aidzu lacquer, or when the grain of the wood is shown.

Nikawa (glue).—This is used to mix with the groundwork for cheap kinds of ware, instead of lacquer

Yuyen-sumi (lampblack).—Used for groundwork of cheap articles, mixed with Persimmon juice. For still more common ware, soot of any kind is used.

Gofun (whiting).—Made from burning old shells, such as are obtained from the ancient kitchen middens; used for mixing with glue to make the groundwork of common lacquer.

Shō-no (camphor).—Used for mixing with lacquer, to make it thinner and spread more easily.

Hōchō (knife).—Used for scraping off all inequalities of the hempen cloth after it is pasted on the article, &c.

Yoshino-gami.—A very thin kind of paper, made at Yoshino; used for filtering the lacquer before using it.

Jō-ban.—A box with a very hard lacquered lid, usually containing drawers for the various pencils, &c. The lid is used for mixing the lacquer on while working.

Tsuno-ko-ban.—Board for mixing and powdering the deer's-horn ashes before using; generally made of cherry wood or oak.

Muro.—A cave or cellar underground is used, where practicable; otherwise, an air-tight case, made of wood, with rough unplaned planks inside. These are thoroughly wetted before the lacquered article is put in to dry, which occupies a period varying from six to fifty hours, according to the time of the year or style of the lacquer. Lacquer will not dry or harden properly in the open air; it absolutely requires a damp closed atmosphere to do so, otherwise it would run and always remain sticky.

The following are mixtures made by the workman as required. None of these mixtures are forwarded, as the articles forming them are sent separately, and the proportions in which they are used are detailed in each case:—

Kokuso.—A mixture of finely-chopped hemp, with rice starch and branch lacquer sufficient to make a thick paste.

Jino-ko (No. 1).—Powdered burnt clay and branch lacquer, mixed together in the proportion one part of clay to two parts of lacquer.

Jino-ko (No. 2).—The same, mixed in the proportion of ten parts of clay to thirteen of lacquer, and a little water.

Jino-ko (No. 3).—The same, mixed in the proportion of ten parts of clay to eight parts of lacquer and two parts of thin rice starch. This mixture is known in the trade as *Han-dan-ji* (half-step basis).

Jino-ko (No. 4).—The burnt clay powder mixed with liquid glue only in such proportions as will resemble the consistency of lacquer.

Kiri-ko.—A mixture of *Jino-ko* and *Tōno-ko* in equal portions with one and a-half of branch lacquer. This becomes very hard.

Sabi.—A mixture of two parts of the burnt clay from Mount Mari to one and a-half of branch lacquer, with just sufficient water to mix the clay into a paste.

An inferior class of *Sabi* is made by putting in less lacquer—as little as eight parts of lacquer being used to twenty parts of the clay. Less lacquer cannot be used, as it would not stand polishing after having been dried.

Mugi-urushi.—Wheat lacquer; being a portion of wheaten flour mixed with branch lacquer to such consistency as may be required. It is used to paste the hempen cloth on to the wood.

Shun.—A mixture of rice flour with branch lacquer, used for the same purpose as wheat lacquer. Wheaten flour is the best, but being more difficult to blend with lacquer it is not so much used.

Ka-no-ji.—A mixture of whiting and liquid glue, used for under coats or cheap articles.

Shibu-ji.—A mixture of lampblack and Persimmon juice, used for under coats in inferior ware.

Mode of applying the lacquer in making—

(a.) *Honji* (real basis). Class I.

1. The article to be lacquered is first carefully smoothed.
2. The wood is slightly hollowed away along each joint, so as to form a circular depression.
3. The surface of the whole article is then given a coating of branch lacquer (this is called *Ki-ji-gatame*—hardening the wooden basis), and the article set to dry in the damp press, or *Muro*, for about twelve hours.
4. The hollowed portions are filled with prepared *Kokuso*, which is well rubbed in with a spatula made of the wood of the *Chamæcyparis obtusa*, and the article is inclosed in the drying press for a period of at least forty hours.
5. Over the *Kokuso* a coating of *Sabi* is applied, and set to dry for twelve hours.
6. The next process is to smooth off with a white whetstone any roughness or inequalities of the *Kokuso* and *Sabi*.
7. The article is then given a coating of wheaten lacquer, over which is stretched hempen cloth, great care being taken to spread it smoothly and leave no wrinkles or perceptible joinings, and it is then again inclosed in the drying press for about twenty-four hours.
8. After taking the article out of the press all inequalities in the cloth —which has now under the influence of the lacquer become harder than wood—are smoothed down with a knife or with a plane.
9. Next, a coating of *Sabi* is applied with the spatula, to hide the texture of the hempen cloth, and the article is again put in the press for twenty-four hours.
10. Next, a coating is given of No. 1, *Jino-ko*, applied with the spatula, after which the article is inclosed in the drying press for twenty-four hours.

11 and 12 are repetitions of the same process.

13. Next, the article is given a coating of *Kiriko*, likewise applied with the spatula, and the drying process is repeated for twenty-four hours.

14. This is a repetition of the same process, after which the article is set to dry for at least three days.

15. The surface is next ground smooth with a fine white whetstone.

16. A hardening coat of branch lacquer is given with a spatula, and set to dry for twenty-four hours.

17. A fresh coat of *Sabi* is applied with the spatula, and the article is put to dry in the press for twenty-four hours.

18. When thoroughly hardened the surface is ground smooth with a white whetstone, as before.

19. Next, a thin coating of branch lacquer is applied with the spatula, and the article is set to dry in the press for twelve hours.

20. A coating of *Naka-nuri* is then applied with a flat brush (*Hake*), and the article set to dry again for twenty-four hours.

21. On being taken out the surface is ground smooth with charcoal made from *Hōnoki* (*Magnolia hypoleuca*).

22. A thin coating of branch lacquer is given with cotton wool—old wool being chosen because less likely to leave hairs behind it—and rubbed off again with soft paper, after which the article is set to dry for twelve hours.

23. A coating of *Rō* (black lacquer) is then applied, and the article is set to dry for twenty-four hours.

24. The surface is rubbed smooth with a piece of charcoal made from *Hiyakujikko* (*Largerstramia indica*).

25 and 26 are repetitions of 23 and 24.

27. The surface is partly polished with finely-powdered *Largerstramia* charcoal, applied with a cotton cloth.

28. A coating of *Rō* is applied very thinly with cotton wool, and this is rubbed off again with soft paper, after which the article is inclosed in the drying press for twenty-four hours.

29. The surface is now polished with an equal mixture of powdered burnt clay from Mount Mari (*To-no-ko*) and calcined deer's-horn ashes, applied with a cotton cloth and a little oil (made from *Lesasnum orientalis*), till a fine polish is obtained.

30. A coating of branch lacquer is next given, applied with cotton wool very thinly, and the article is inclosed in the drying press for twelve hours.

31. The workman dips his finger in oil and rubs a small quantity of it over the surface, which he then polishes with deer's-horn ashes, applied with a cotton cloth, till a bright surface is obtained.

32. A coating of branch lacquer is applied as in No. 30, wiped off with soft paper, and set to dry for twelve hours.

33. The oil is applied as in No. 31, and then a final polishing with deers' horn ashes, given with the finger to the surface, which now assumes the most brilliant polish of which it is capable.

For articles that are liable to get rubbed, such as scabbards, these last two processes are repeated seven or eight times, the surface getting harder at each repetition, but this is not necessary for other articles even of the best quality. In describing the above processes the *minimum* time for drying has in each case been given, but for the first twenty-five processes the longer the article is kept in the press the better. From the twenty-eighth process to the finish it is better not to greatly exceed the times mentioned.

(*b.*) *Kata-ji* (hard basis). Class II.—Specimens sent.

The first six processes are the same as those used in making articles, Class I.

7. For wheaten lacquer substitute rice flour lacquer (*Shin*), the method of application being identical.

8. Same as in Class I.

9. Omitted.

10, 11, and 12. For No. 1 (*Jino-ko*), substitute No. 2 (*Jino-ko*).

13 to 18. Same as in Class I.

19. The article is now rubbed over with Indian ink mixed with water such as is used for writing purposes, and applied with cotton wool.

20 to 24. Same as in Class I.

25 and 26. Omitted.

27 to 33. Same as in Class I.

(*c.*) *Handan-ji* (half-step basis) Class III.

The first six processes are the same as those used in making articles, Class I.

7. Instead of hempen cloth, paper is frequently substituted.

8 and 9. Omitted.

10, 11, and 12. Three coats of No. 3 (*Jino-ko*) are given to the article, which is then dried in the sun instead of being inclosed in the press. The three coats can be applied in one day.

13 to 16. Omitted.

17. A coating of inferior *Sabi*, containing less lacquer, is applied, and dried in the sun only. As soon as the water has evaporated, a second coat (17*a*) is given and dried in the same manner.

18. Same as in Class I.

19. Same as in Class II.

20 to 33. Same as in Class II, likewise omitting 25 and 26.

(*d.*) *Manzo* (after a lacquer worker of that name). Class IV.

The first seven processes are identical with those in Class III.

8 and 9. Omitted.

10, 11, and 12. Three coats of No. 4 (*Jino-ko*), containing glue instead of lacquer—first introduced by *Manzo*—are given to the article. They are dried in the sun only.

13 and 14. Omitted.

15. The surface is ground even with a rough whetstone, and afterwards further smoothed with a spatula and a small quantity of water.

16. Same as in Class I.

17 and 17*a*. Same as in Class III.

18. Same as in Class I.

19 *et seq.* Same as in Class II.

The first four classes being modifications of each other, a comparative numbering was adopted, but the following styles differ so materially that this plan can no longer be adhered to.

(*e.*) *Ka-no-ji* (inferior basis). Class V.

In this class the joints of the article to be lacquered are frequently not hollowed away, a strip of paper being merely pasted over them, and even this precaution being often omitted. A coating of *Ka-no-ji* (whiting and glue) is applied with a spatula twice or thrice, and dried in the sun.

4. The article is then wiped over with a wet brush and rubbed smooth with a white whetstone, and afterwards given an extra smoothing with the spatula.

3.?.2

5. Sometimes a thin coating of *Nakanuri* or of branch lacquer is given to the article, but more frequently a coating of glue and lampblack, or of glue and soot mixed together, is applied.

6. A final coating of either *Jō-hana* or *Jōchiu* finishes the process without any subsequent polishing.

(*f.*) *Shibu-ji* (*Persimmon*)—(juice basis). Class VI.

The joints of the article are prepared in the same manner as for Class V, but, instead of *Ka-no-ji*, four or five coats of *Shibu-ji* (Persimmon juice and lampblack) are applied with a brush; these dry very rapidly and the final coating is smoothed with *Tokusa* (*Equisetum*).

5. A final coating of either *Jō-hana* or *Jō-chiu* is given, as in Class V.

This kind of article is chiefly made in Aidzu, and, indeed, goes by the name of "Aidzu Ware." It has not such a good appearance as *Ka-no-ji*, for the grain of the wood is easily traceable under the lacquer, but being made without glue, it stands water much better, and is in general request for rice bowls and *zen* (small dinner trays with legs, one of which is set before each guest).

(*g.*) *Sabi-Sabi* (double Sabi). Class VII.

In this class of goods the joints are generally hollowed out, and a basis-hardening coat of branch lacquer given. Paper is also pasted over the work after filling in the joints with *Koku-so*. Three coats of inferior *Sabi* are then applied, and after drying for about twelve hours in the press, the article is ground smooth with a white whetstone. Next comes a coating of branch lacquer, applied with cotton wool, and then one of *Nakanuri*, which is ground smooth with *Magnolia* charcoal. Another coating of branch lacquer is followed by one of *Jō-hana* or *Jō-chiu*, and the article is finished without further polishing. Drying in the damp press is requisite between each process for this class of lacquer.

It is manufactured only in Tôkiô, though the processes for the under coats of *Wakasa* lacquer are identical. The method adopted for completing *Wakasa* lacquer is described, p. 13 of the accompanying pamphlet. Rice bowls, drinking cups, and luncheon boxes, &c., are the usual articles manufactured. In this, as in Aidzu ware, the grain of the wood is traceable, and its common appearance constitutes the reason for classing it so low, but in actual excellence and durability it ought to rank fourth next to *Handan-ji*.

(*h.*) *Kaki-awase* (mixture), or *Kuro-shunkei* (black Shunkei), from the name of its inventors. Class VIII.

In this class of goods the wood is given a basis-hardening coat of branch lacquer mixed with lampblack, over which is laid a final single application of *Jō-hana* or *Jō-chiu*. This ware is made at Tôkiô, and is used for cheap rice bowls and boxes. For the commonest kind of work a mixture of glue and lampblack or persimmon juice and lampblack is used, instead of branch lacquer as a ground coat.

(*i.*) *Aka-shunkei* (red Shunkei). Class IX.

This kind also derives its name from the inventor. For making articles of this class, which show the natural grain of the wood, a mixture of *Yoshino* lacquer and gamboge is rubbed on with a hard brush, after which they are inclosed for a day in the press to dry, and then a coating of *Shu-urushi* (transparent lacquer, containing a proportion of *Perilla ocymoides* oil) is applied. When dry it presents a polished surface, and it appears dark when at first finished, but in a few months becomes much lighter. A cheaper quality of *Shunkei* is made by using glue and gam-

boge or Persimmon juice and oxide of iron for the under coat, but though the colour has a better appearance at first, it gradually deteriorates.

The best is made in the Province of Dewa, at Akita. For the most part soft woods are used in making this ware.

(*j.*) *Ki-ji-ro* (colour of the grain of wood).

1. Well-seasoned wood is selected, and the article having been carefully smoothed—

2. A thin coating of *Yoshino* lacquer is applied with a brush, after which it is set to dry in the press for twelve hours.

3. A coating of best *Sabi* is then applied with the spatula, and set to dry in the press as usual.

4. This is ground completely away with a green whetstone.

5. A coating of *Nashiji* (pure transparent lacquer) is now given, and the article is inclosed in the press for twenty-four hours.

6. It is again ground with a green whetstone till no remains of the lacquer coating are apparent.

7. Then follows a second coat of transparent lacquer, which, after drying as before,

8. Is ground smooth with a piece of *Hiyakujikko* (*Largerstramia indica*) charcoal.

9. Transparent lacquer is again applied with a piece of cotton wool, and wiped off with soft paper, and the article is set to dry for twelve hours.

10. Afterwards it is given a preliminary polish with an equal mixture of *To-no-ko* and deers' horn ashes applied with a cotton cloth and a little oil.

11. Next, a coating of *Yoshino* lacquer is applied with cotton wool, wiped off with paper, and set to dry as before.

12. At this stage only deers' horn ashes, with a trifle of oil, are used for polishing. This process is repeated three times, and results in an exceedingly brilliant polish. Only hard woods are used for this kind of ware.

(*k.*) *Red and Coloured Lacquers.*

For making best red and other coloured lacquers the first twenty-two processes are the same as in *Honji*, Class I. Next a mixture of *Nashiji* (pure transparent lacquer) and vermilion, or the colour desired, is given to the article, which is thereupon set to dry. The remainder of the processes are identical with Class I, except that in Nos. 30 and 32 *Yoshino* lacquer is substituted for "branch lacquer," and in No. 28 transparent varnish is used instead of *Rō* (black lacquer). For extra high-class work, instead of the thin coating of lacquer (No. 28) which is wiped off again, a thick coating of transparent varnish is given, applied with a brush, and set to dry for about thirty-five hours, the remaining processes remaining unchanged.

For second-rate articles the colour is mixed with *Shu-urushi* (transparent lacquer containing oil), No. 23, and no after polishing takes place. The article presents a brilliant surface, and the colour is better and brighter than in the best kind, but the surface much less hard. Many processes are omitted for cheaper articles, as is the case in black lacquer, and less lacquer and more oil is used.

Colouring Matters used.

Shu (vermilion).—For red lacquer, used also mixed with gold dust for shading.

Sei-shitsu (green lacquer).—A mixture of *Kiō* (chrome yellow) and *Bero-ai* (Prussian blue).

Muras-aki-ko (purple powder).—A mixture of white lead and *Tō-beni* (*Magenta roseine*).

Benigara (red oxide of iron).—Sometimes used instead of vermilion.

In the district of Aidzu the light colours are produced to the greatest perfection, viz., yellow, green, and intermediate shades. In Tôkiô, though the same materials are used, the resulting colours are inferior and darker. In Aidzu no after polishing takes place with coloured lacquers. The lacquer is applied like paint. Tôkiô is, however, best for black lacquer, as well as for such high-class red, &c., as are polished afterwards. These differences are attributed to some climatic influence. The *Kioto*, so called "black lacquer," shows a reddish-brown tinge. With the exception of Tôkiô, Kioto, Osaka, Kaga, Tsugaru, Wakasa, Nagova, Suruga, and Shidzuoka, and one or two isolated places, the method of smoothing with charcoal and afterwards polishing is not pursued. In Tsugaru and Wakasa neither flat nor raised gold lacquer are manufactured.

It should be mentioned that the plain lacquered articles are almost exclusively manufactured by one set of workmen, who supply the workers in gold lacquer with the articles ready for the application of the gold powdering, various patterns, &c.

The wholesale lacquer trade is in the hands of a few large merchants. In Tôkiô there are two houses only. These receive the crude lacquer from the producers as it arrives from the various districts, either buying it outright or making advances to the contractors, who are bound by the rules of the guild to deliver only to them. They sell it in quantities as required to the lacquer manufacturers, who prepare and refine the sap for the market, and these again retail the material to the lacquer workers. The various processes that the lacquer undergoes in the hands of these manufacturers before retailing are kept secret, only the approximate tures being known.

That all lacquer, even that sold as pure lacquer, undergoes some adulteration, is rendered evident from the fact that, in accordance with a strange custom peculiar to the lacquer trade, the retail manufacturers sell even the smallest quantity at the same rate at which they buy it from the wholesale merchant.

Tools and Materials used in the manufacture of Gold Lacquer.

Neji-fude.—Brushes made of rats' hair, used for tracing out the patterns, and for drawing the very fine lines, &c. The best are made of the long hairs from the backs of "ship rats," whose fur is not so likely to get rubbed.

U-no-ke-usuji-fude (fine brushes made of hares' hair).—These are a little larger than rats' hair brushes, and are used for filling in the patterns of the best articles, also for drawing outlines on common articles and ground work. There are two sizes, *Dai* and *Sho*, used for drawing "large" and "small." There are besides five sizes of *Ji nuri fude* (grounding brushes), known as—

T-cho (number one).

T-cho-han (number one and a-half).

Ni-cho (number two).

Ni-cho-han (number two and a half).

San-cho (number three).

U-no-ke-hake (a flat brush made of hares' hair, used for spreading the lacquer on large pieces of work).—There are two sizes used.

Men-sō (a stiff brush made of deer's hair, used for applying the *Subi*, &c., in making raised gold lacquer).—It is only used for stiff mixtures.

Haké (flat brushes of human hair, for smoothing the lacquer after application, as in ordinary plain lacquer).—There are two sizes used.

Bun-mawashi (compass with fine brush attached for describing circles).

Ké-bo (brushes made from the long body hairs of a horse, used for smoothing the fine gold powder and brushing off extra particles, used also for dusting).—There are four sizes.

Fude-kake (brush rest).

Fude-arai (brush cleaner, made either of ivory or tortoise-shell).—The brushes have to be very carefully cleaned after using with *Sesamum orientalis* oil, to remove every trace of lacquer.

Tsutsu (a quill, from the wing of a swan or crane, over one end of which is stretched a piece of silk, used for scattering the gold dust).—There are two sizes used.

For applying *Nashiji* or *Hirame* bamboo tubes of three different sizes are used, with silk of more open texture.

Saji (spoon), for putting the gold dust into the quill or bamboo tube.

Hirame-fude.—A pointed piece of bamboo or other wood, used for picking up and applying *Hirame*, or the gold, or shell squares.

Kujira-bera (whalebone spatula).—Used for mixing the materials, and also when transferring the tracing on the paper to the article to be painted (process described farther on). The kind used is called island whalebone, and comes from China; that obtained from Japan is practically useless, being liable to split. Two sizes are used.

Hera.—Spatulas made of *Hinoki* (*Chamaecyparis obtusa*), smaller than those used by workers in plain lacquer. There are three sizes used for applying plain lacquer, and three sizes for applying *Sabi*.

The Tooth of a fish, ordinarily the *Tai* (*Cerranus marginalis*), fastened with lacquer on to a piece of bamboo, used for polishing such crevices as are too small to admit of charcoal, &c., being used.

A piece of polished shell, used for smoothing the paper on which the pattern is drawn before tracing with lacquer.

Tsume-ban.—A palette, made either of tortoise-shell or buffalo horn, worn on the left thumb.

Take-ban.—A small bamboo board, used when cutting the gold and silver foil into squares.

Jō-ban.—Box for holding brushes, &c. (described before).

Tsuno-ko-ban.—(Described above.)

Fun-bako.—A flat black-lacquered box for holding the gold dust.

Charcoal of three kinds.

Hono-ki (*Magnolia hypoleuca*).

Tsubaki (*Camellia japonica*).

Hiyakujikkō (*Largerstramia indica*).

Shiō (gamboge).

To-no-ko, Jino-ko, Tsuno-ko, To-ishi.—(Described above.)

Gold and Silver Dust used for Ornamentation.

Of these there are several kinds, viz.: *Yasuri-ko* or *fun* (file-powder), made in *Yaki-kin*; (Pure gold) *Koban-kin* (10 parts gold to 2$\frac{1}{10}$ silver); *Gin* (silver).

There are twelve qualities of each, differing in fineness, and are known by the following names, beginning with the coarsest:—

(N.B.—For sake of reference, the numbers are made to correspond with those on the specimen board.)

1. *Ara-tsune.*
2. *Chin-tsune.*
3. *Komaka-me-tsune*

4. *Mijin-tsune.*
5. *Hanako.*
6. *Mijin.*
7. *Komaka-me-mijin.*
8. *Aragoku.*
9. *Goku-gashira.*
10. *Goku-mijin.*
11. *Komaka-me-goku-mijin.*
12. *Usuji.*

Besides these, there is an extra large kind, used for ground-work, called *Hira-me* (flat-eye). The coarsest filings, whether of pure gold, *Koban*, or silver, are taken and rolled out flat on an iron plate. Of *Hirame* there are eight kinds each, known by the following names:—

13. *Dai-dai-ichi.*
14. *Dai-ichi.*
15. *Dai-ni.*
16. *Dai-san.*
17. *Ai-no-san.*
18. *Tsune-no-san.*
19. *Shō-san.*
20. *Saki.*

Next comes the kind called *Nashiji*, from its resemblance, when applied to the article, to the rind of a pear.

Nashiji is used for ground-work, in making which pure gold, also *Koban-kin* (10 parts gold, $2\frac{6}{10}$ silver), *Jiki-ban* (10 parts gold, $3\frac{1}{10}$ silver), *Nam-ban* (10 parts gold, $3\frac{6}{16}$ silver), and silver, of seven qualities of fineness each, are used.

21. *Dai-ichi.*
22. *Dai-ni.*
23. *Dai-san.*
24. *Ai-no-san.*
25. *Tsune-no-san.*
26. *Shō-san.*
27. *Saki.*

Aka-fun (red powder), Nos. 28, 29, and 30, is vermilion mixed with pure gold, *Koban-kin*, and silver, for shading.

Kuro-fun (black powder), Nos. 31, 32, and 33, is camellia charcoal powder mixed with pure gold, *Koban*, and silver.

Giyōbu nashiji is the coarsest kind of *Nashiji* made; 34, pure gold, and 35, silver; but it is little used, as it requires seven or eight coats of lacquer to be applied before it is covered sufficiently to stand polishing.

Awogai-mijin (fine green shell), No. 36, is a specimen of the application of powdered shell as ground-work.

Keshi-fun.—This is the finest kind used; it is only made in pure gold and *Koban*, Nos. 37 and 38. This is made by mixing gold-leaf in liquid glue till it is reduced to an impalpable powder; water is then added, and when the gold sinks the liquor is poured away. This is repeated till all the glue has been got rid of.

Shaku-dō-fun.—A mixture of seven parts pure gold and three parts of copper powder, No. 39.

Kana-gai.—Foil made of pure gold, *Koban*, and silver, Nos. 40, 41, and 42. It is made of four thicknesses in each quality, viz.: *Hon-neji*, *Chiu-neji*, *Usushu*, *Kime-tsuke*, the last being the thinnest.

Besides the above, there are several mixtures, as—

Kuri-iro-fun (chestnut-coloured powder).—A mixture of one-half gold dust with powdered camellia charcoal and vermilion.

Nedzumi-iro-fun (rat-colour grey).—A mixture of half silver and powdered camellia charcoal, and a little vermilion.

In each case it is evident that several distinct shades can be obtained according as more or less colour is added to the gold and silver dust. It is a remarkable fact that (as I am informed) no vegetable colours can be used with lacquer. They are all eaten up, as it were, by the lacquer and disappear, which accounts for the very few variations seen in the colours of lacquer. The workmen have never been able to produce white, purple, or any of the more delicate shades.

Of late years, since cheap work has been introduced, the custom of using tin dust has been adopted for making common *Nashiji*. It is manufactured of the same sizes as in gold and silver, and when plenty of gamboge is mixed with the lacquer to cover it an inexperienced person might easily mistake it for gold when the ware is new, but it soon deteriorates. Burnt tin dust is also sometimes used for under coats in making cheap raised lacquer.

Mode of making Gold Lacquer.

(*a.*) *Togi-dashi* (bringing out by polishing).—The article having been subjected to the first twenty-two processes, as described in making *Honji* (Class I), is then treated as follows :—

The picture to be transferred to the article is drawn on thin paper, to which a coating of size made of glue and alum has been applied—that known as *Mino-gami* is best. The reverse is rubbed smooth with a polished shell or pebble, and the outline very lightly traced in lacquer, previously roasted over live charcoal to prevent its drying, with a fine brush made of rats' hair. The paper is then laid, with the lacquer side downwards on the article to be decorated, and is gently rubbed with a whalebone spatula wherever there is any tracing, and on removing the paper the impress may very faintly be perceived. To bring it out plainly, it is rubbed over very lightly with a piece of cotton wool, charged with powdered white whetstone or tin, which adheres to the lacquer. Japanese paper being peculiarly tough, upwards of twenty impressions can be taken off from one tracing, and when that is no longer possible, from the lacquer having become used up, it only requires a fresh tracing over the same paper to reproduce the design *ad infinitum*. This tracing does not dry owing to the lacquer used for the purpose having been partially roasted, as previously mentioned, and can be wiped off at any time.

The next process is to trace out the veining of the leaves, or such lines to which in the finished picture it is desired to give the most prominence, and these lines are powdered over with gold dust through a quill. The qualities called *Mijin*, *Kemu-kame-mijin*, and *Arogoku*, are generally used ; either finer or coarser qualities cannot be used. The article is then set to dry for twenty-four hours in the damp press. The outline is now drawn carefully with a rat's hair brush over the original tracing line with a mixture of black and branch lacquer, called *Rō-se*. The whole is then filled in with *Rō-sé* applied with a hare's hair grounding brush. Gold dust of a slightly coarser quality than *Mijin* is scattered over the lacquered portion, and the article is set to dry for twenty-four hours. Another thin coating of *Rō-sé* lacquer is again given to the gold-powdered portions, and the article set to dry for twelve hours. Next, a coat of *Rō* (black lacquer) is applied over the whole surface of the article, which is set to dry for at least three days. It is then roughly ground down with *Magnolia* charcoal, the surface dust being constantly wiped off with a damp cloth till the pattern begins to appear faintly. Another coating of *Rō* lacquer is

then given and the article set to dry for thirty-six hours. It is again ground down with *Magnolia* charcoal as before, this time till the pattern comes well out. The ensuing processes are the same from 28 to 38 inclusive, as in black lacquer (*Honji*, Class I).

In making *Togi-dashi* on hard woods, transparent lacquer is used instead of *Rō*.

(*b.*) *Hira-makiye* (flat Gold Lacquer).

The article having been thoroughly finished, either in black or red, &c., as already described under the head of *Honji*, Class I, and the following kinds, a tracing is applied to the surface as in *Togi-dashi*, the outline is carefully painted over with a fine brush of rat's hair, and then filled in with a hare's hair brush, using *Shitamaki* lacquer (branch lacquer and red oxide of iron). Over this surface gold dust, of the quality called *Aragoku* being generally used, is scattered with a brush of horse's hair (*Kebo*) till the lacquer will not absorb any more. The article is then set to dry for twenty-four hours. A thin coating is next applied over the gold, of transparent lacquer or *Yoshino* lacquer, and set to dry for twenty-four hours at least. It is then most carefully smoothed with camellia charcoal, and finally polished off with *Tono-ko* and a little oil on the point of the finger, till the ornamented portion attains a fine polish. The veining of leaves and the painting of stamens, &c., of flowers, or such other fine work, is now done with a fine rat's hair brush charged with *Ke-uchi* lacquer over which fine gold dust (*Goku-mijin*) is scattered from a brush of horse's hair (*Kebo*) as before, and the article set to dry for twelve hours. Some *Yoshino* lacquer is then applied to a piece of cotton wool, and rubbed over the whole surface of the box or other article, and wiped off again with soft paper. It is set to dry for twelve hours, after which it is polished off with deer's horn ashes and a trifle of oil. When very high-class work is desired, *Yoshino* lacquer, to which a little water has been added, is applied, and polished off a second time, and a very brilliant surface is attained.

More ordinary "flat gold lacquer" differs in the manufacture as follows: The tracing is accomplished in the same manner, but *Shitamaki-nobe* lacquer (branch lacquer, red oxide of iron, and camphor) is used for filling in the pattern with a hare's hair brush. The article is then set to dry in the press for ten to twenty minutes, during which time the lacquer has begun to harden, and less gold will adhere. Then gold dust (*Goku-mijin*) is applied with cotton wool thinly, and the article is set to dry for twenty-four hours. The whole surface is then smeared over with *Yoshino-nobe* lacquer (*Yoshino* lacquer and camphor) on a piece of cotton wool, and wiped off again with soft paper. The reason is that it is less trouble to smear over the whole surface thinly, and it is, moreover, not necessary to give a thick coat of lacquer to the decorated part, as the gold dust has been very thinly applied. It is set to dry for twelve hours and ground smooth with camellia charcoal and polished with powdered whetstone and oil on the point of the finger. The fine lines are then drawn with a rat's hair brush charged with *Shitamaki* lacquer, and sprinkled with gold dust (*Goku-mijin*) from a brush (*Kebo*), and the article set to dry for twelve hours. The whole is again smeared with *Yoshino-nobe* lacquer and carefully wiped off again with paper, and set to dry for twelve hours. The article is then polished with powdered whetstone and oil on the point of the finger, and a second application of *Yoshino-nobe* lacquer with a little water, wiped off with soft paper, set to dry for twelve hours, and finally polished off with deers' horn ashes and oil on the finger, finishes the operation.

Should it be required to make any dark spots or lines, such as birds'

eyes, or to draw human hair, &c., or other shading, this is done last of all with *Kuma*, "bear" lacquer, *Jō-kana*, and lampblack.

More Common Kind of Flat Gold Lacquer Painting.

Instead of tracing the design in roasted lacquer, it is done with a mixture of powdered *Tono-ko* and water, and the impression is transferred to the articles with the whalebone spatula as before. The reason for only using *Tono-ko* instead of lacquer is that the ground-work being inferior it cannot be ground or smoothed afterwards, and the edges of the pattern would not be clean, nor stand out clear, should any lacquer get smeared outside the tracing line. The outline is then filled in with *Shitamaki-nobe* lacquer with a coarse hare's hair brush, and the article is set to dry for twenty minutes, or till a thin skin has formed on the lacquer, and then the half-dry surface is wiped over with cotton wool charged with *Keshi-fun*, the finest gold powder, and set to dry for five or six hours. The whole surface is then smeared with *Yoshino-nobe* lacquer, which is carefully wiped off again with soft paper, and the article set to dry for half-a-day. The surface is then rubbed over gently with deers' horn ashes and soft paper to give it a polish, and to get rid of any of the last coat of *Yoshino-nobe* lacquer.

The fine lines are now drawn with a fine hare's hair brush charged with *Shitamaki-nobe* lacquer, and the article set to dry for twenty minutes or so; then *Keshi-fun* is applied with cotton wool, and again set to dry for five or six hours. No further process takes place.

(c.) *Taka-makiye* (raised Gold Lacquer).

The ground-work may be either black or coloured lacquer, *Nashiji* (pear basis of gold dust), or the plain wood. The outlines of the pattern are transferred to the surface of the article in the same manner as in *Togi-dashi*, or "flat lacquer." The outline is then painted over with *Shitamaki* lacquer, and this is covered with powdered camellia charcoal. If the outside is to be higher than the inside, a broad margin is painted and covered with the charcoal powder, leaving the centre untouched, and *vice versâ*; if the centre is to be higher a faint line only is painted outside, and the inside is given a thickish coating, which is sprinkled with the charcoal dust, and the article set to dry for twelve hours. When taken out of the press it is well dusted to get rid of any loose charcoal powder, and is also washed, using a brush made of human hair (*Hake*) to clean out all crevices and bring out the lines, &c. Some *Yoshino-nobe*, or "branch lacquer," with camphor, is now rubbed on with a piece of cotton wool and carefully wiped off with soft paper, and the article set to dry for twelve hours. The raised parts are next carefully ground smooth with a piece of *Magnolia* charcoal, and a second coat of *Yoshino-nobe*, or of "branch lacquer," is applied as before and dried.

[If a well-raised pattern is required, one, two, or even three coats of *Sabi* ("branch lacquer" and *Tono-ko*) are applied, the outside edges being painted with a brush of deer's hair (*Menso*), and the inside lacquer applied with a small *Sabi* spatula, the article being set to dry between each application for twelve hours. For coarser work it is then ground smooth with a white whetstone, and for finer work with a yellow whetstone. Over this some "branch lacquer," mixed with camphor, is rubbed with cotton wool and wiped off with soft paper, and the article set to dry for twelve hours.]

If the pattern is not to be very high the operations described between the brackets are omitted. A coating of *Takamaki* lacquer is now given, the outside edges being carefully drawn with a rat's hair brush, and the inside of the pattern filled in with a hare's hair brush, and the article set

to dry for thirty-six to forty-eight hours. When taken out of the press the surface is ground smooth with *Magnolia* charcoal, and then partly polished with powdered camellia charcoal on a cotton cloth. A little oil is now rubbed on, and a further polishing takes place with powdered "whetstone" on a cloth. Next, "branch lacquer" is rubbed over the raised parts with cotton wool and wiped off with soft paper, and the article set to dry for twelve hours. It is next polished with deers' horn ashes and a little "rape seed," or "sesamum" oil applied on the point of the finger. Up to this point the formation of the pattern, whether mountains, waves, trees, men, birds, or animals, has been gradually completed.

If small squares of gold foil (known as *Kiri kane*), or of coloured shell, are used in producing the pattern, they are now applied one by one on the point of a bamboo stick (*Hirame fude*), the spot where they are to be affixed having been smeared with a little *Rō-sé* lacquer to make them adhere. When all that is required has been affixed, a piece of soft bibulous paper is spread over the freshly done parts and pressed very carefully with the finger. This is to get rid of as much of the *Rō-sé* lacquer as is not covered by the gold squares as possible; the article is set to dry for twelve hours, and then the portion where the gold has been applied is gently polished with a little camellia charcoal on the point of the finger, to get rid of the remainder of the *Rō-sé* lacquer. Shell patterns, and the coarser kinds of gold dust that may be required, are applied in the same manner. The finer kinds of gold dust are applied next, over a coat of *Shitamaki* lacquer, and the article set to dry for twelve hours. The remaining processes of polishing, drying, &c., are the same as in first-class "flat gold" lacquer.

For making raised lacquer patterns on plain wood the whole surface is covered with tin-foil, stuck on with rice paste, to keep the wood quite clean, and then the place only where the pattern is to come is cut out. In making all high-class lacquer the edges of every article are pasted over with tin-foil to prevent their being rubbed or injured by the workman, and the same is done over each portion as it is finished.

The above is the ordinary method of making best raised lacquer, but from a glance at the specimens which accompany this paper it will be seen immediately that there are such innumerable modifications of one process or another, according to the object to be produced, that it is manifestly impossible to do more than give the above cursory sketch. Nearly every piece of good lacquer made exhibits a specimen of each kind, viz., *Nashiji*, *Togi-dashi*, *Hira-makiye*, or *Taka-makiye*.

In making raised lacquer on inferior articles the methods do not vary much from the good kinds; the work is merely less carefully executed. The saving is in the quantity and quality of the gold dust used, and the absence of minute after work, or in the use of silver and tin instead of gold dust. In the very cheapest kinds burnt tin dust is used instead of charcoal over the first coat of *Shitamaki*. This is burnished bright, and over it a thin coating of lacquer and gold dust is applied. At first it looks well, but loses its colour in a year or two. By using tin powder the same height is attained in one coat that would necessitate at least three coats of lacquer and charcoal dust. This kind of work is, however, only used for cheap articles for foreign export, and has been quite lately introduced.

(*d.*) *Lacquering on Metal.*

For lacquering on iron or copper, brass or silver, the metal is smoothed and polished, and then given a coating of "crude lacquer," or "black lacquer;" the article is put over a charcoal fire, and the lacquer is burnt on to the metal till all smoke ceases to escape. The fire must not be too fierce, and the metal must not be allowed to get red hot, or the lacquer

turns to ashes. After the lacquer has burnt quite hard the surface is rubbed smooth with *Largerstramia* charcoal; these operations are repeated three or four times, till a good foundation of lacquer has been obtained. Then the same operations exactly are repeated as in making best "black lacquer," *Togi-dashi*, "flat gold lacquer," or "raised gold lacquer," only that the lacquer is burnt dry over the fire instead of being dried in the press. The lacquer is thus rendered quite hard and very durable. After the first two or three coats have been burnt on, the subsequent drying processes can be carried on in the damp press, should it be so desired.

In winter, or when any article is required in a hurry, the workmen sometimes put a charcoal fire in the press, over which a pan of hot water is placed. The steam which is thus generated helps to dry the lacquer in an hour or two, which would take twenty-four hours to harden ordinarily, but the lacquer thus dealt with loses its strength, and is never very hard. "Black lacquer" turns a rusty brown, the colouring virtue of the iron being apparently lost, and therefore this plan is never adopted for good work, and in second-rate work only for under coats.

Nashiji (pear basis).—This style of ornamentation, occupying an intermediate position between plain and ornamental lacquer, is therefore treated of last. Till the opening of Japan to foreign trade it was in the hands of workers in gold lacquer, but now for the most part all *Nashiji* on articles intended for exportation is applied by the workers in plain lacquer. In making best *Nashiji*, as in *Togi-dashi*, the first twenty-two processes are identical with *Honji*, Class I. A coating of *Rō-sé* is applied, and the gold dust is sprinkled over this surface through one or other of the bamboo tubes, according to the fineness required. The article is set to dry in the press for forty-eight hours, and is then given a coating of pure transparent varnish. This is set to dry for three or four days, when it is roughly ground with *Magnolia* charcoal, and a second coat of transparent lacquer given. The article is set to dry for forty-eight hours, and then ground with *Magnolia* charcoal till a perfectly smooth surface is obtained. Transparent lacquer is then applied with a piece of cotton wool, and wiped off again with soft paper, and the article set to dry for twenty-four hours. It is then polished with a mixture of *Tono-ko* and camellia charcoal powder and a little oil. Next, a coating of *Yoshino* lacquer is given, and wiped off with paper; the article is set to dry for twelve hours, and then it is polished with deer's-horn ashes and oil. This is repeated three times to finish the article.

The same processes are gone through when using silver instead of gold dust.

For cheap qualities tin dust is used, and the powder is scattered on glue immediately above a coating of *Kanoji* (whiting and glue). When the article is dry it is burnished with *To-kusa* (*Equisetum*), and as soon as it presents a bright surface a coating of pure transparent lacquer, with gamboge, is given to it. It is set to dry for a day in the press, and then ground with *Magnolia* charcoal. Over this a coating of *Shu-urushi* (transparent varnish containing oil) is applied, and another drying for twenty-four hours completes the process.

(Signed) JOHN J. QUIN.

Tokio, January 13, 1882.

CATALOGUE OF SPECIMENS FORWARDED.

[The specimens alluded to in the Report are exhibited in No. 1 Museum, in the Royal Gardens at Kew.]

1. **Kawa-muki.** Bark-parer.
2. **Yeda-gama.** Branch sickle.
3. **Kaki-gama.** Scraping sickle.
4. **Yeguri.** Gouge.
5. **Natsu-bera.** Summer spatula.
6. **Hōchō.** Knife.
7. **Seshime-bera.** Seshime spatula.
8. **Gō.** Bamboo or wooden pot to hold the lacquer.
9. **Gō-guri.** Pot gouge.
10. **Te-bukuro.** Glove.
11. Specimens of lacquer tree (small).
12. " " (larger size).
12 A. Small stems.
13. **Hinoki.** (*Chamæcyparis obtusa.*)
14. **Kiri.** (*Paulownia Imperialis.*)
14 A. Kiri (old).
15. **Hōnoki.** (*Magnolia hypoleuca.*)
16. **Sawara.** (*Chamæcyparis pisifera.*)
17. **Hime-ko-matsu.**
18. **Tsuga.** (*Abies tsuga.*)
19. **Hiba.** (*Thujopsis dolabrata.*)
20. **Akamatsu.** (*Pinus densiflora.*)
21. **Sugi.** (*Cryptomeria japonica.*)
22. **Keyaki.** (*Planera japonica.*)
23. **Shoji.**
24. **Sakura.** (*Prunus pseudo cerasus.*)
25. **Katsura.** (*Cercidiphyllum japonicum.*)
26. **Tchō Ginko biloba.**
27. **Igo.**
28. **Buna.**
29. **Shitan.**
30. **Tagayasan.**
31. **Karin.**
32. **Kuwa.**
33. **Keyaki.** (*Planera japonica.*)
34. **Ki-urushi** (nami). Ordinary crude lacquer.
34 A. **Ki urushi** (Jō koshi) best filtered lacquer.
35. **Seshime-urushi.** Pure branch lacquer.
35 A. **Seshime.** Lacquer as sold.
36. **Rō-urushi.** Black lacquer.
37. **Haguro.** Tooth-dye. Broken, all contents gone.
38. **Nakanuri-urushi.** Middle painting lacquer.
39. **Nuritate-urushi.** Finishing lacquer.
40. **Jō-hana-urushi.**
41. **Jō-chiu-urushi.**
42. **Jo-tame-urushi.**
43. **Shu-urushi.** Vermilion lacquer.
44. **Nashiji-urushi.** Pear-husk lacquer.
45. **Yoshino-urushi.**
46. **Yoshino-nobe-urushi.** Yoshino spreading lacquer.
47. **Seshime-urushi.** Seshime spreading lacquer.
48. **Shitamaki urushi.** Under-coat lacquer.
49. **Ke-uchi-urushi.** Inside line lacquer.
50. **Shitamaki-nobe-urushi.** Under-coat spreading lacquer.
51. **Takamaki-urushi.** Raised lacquer.
52. **Rō-sé-urushi.** Mixture of black and branch lacquer.
53. **Kenna.** Black liquid.
54. **Hera.** Spatula made of Hinoki. (3 specimens.)
55. **Hake.** Flat brush made from human hair. (4 specimens.
56. **Kokuso.** Finely-chopped hemp.

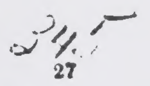
57. Nuno. Hempen cloth.
58. Silk. Used for fine work.
59. Ji-no-ko. Burnt clay.
60. Tono-ko. Burnt clay from Mount Mari.
61. Hō-nō-ki-sumi. *Magnolia hypoleuca* charcoal.
62. Hiyakujikkō-sumi. *Largerstramia indica* charcoal.
63. Ara-to-ishi. Rough whetstone.
64. Shiro-to-ishi. White whetstone.
65. Awo-to-ishi. Green whetstone.
66. Nagura-to-ishi. From quarry at Nagura.
67. Tsuno-ko. Deers' horn ashes.
68. To-kusa. *Equisetum.*
69. Kaki-no-shibu. Persimmon juice.
70. Nikawa. Glue.
71. Yuyen-sumi. Lampblack.
72. Go-fun. Whiting.
73. Shō-no. Camphor.
74. Hōchō. Knife.
75. Yoshino. Paper.
76. Jo-ban. A box for pens, &c.
77. Tsuno-kohan. Board for mixing ashes, &c.
78. Muro. Drying-press.
79. (*a.*) Honji. Class I. Real basis. (Number of specimens, 34; 32 separate pieces.)
80. (*b.*) Kataji. Class II. Hard basis. (Number of specimens, 6.)
81. (*c.*) Handanji. Class III. Half-step basis. (Number of specimens, 8.)
82. (*d.*) Manzo. Class IV. (Number of specimens, 8.)
83. (*e.*) Ka-no ji. Class V. Inferior basis. (Number of specimens, 6.)
84. (*f.*) Shibu-ji. Class VI. Persimmon-juice basis. (Number of specimens, 5.)
85. (*g.*) Sabi-sabi. Class VIII. Double Sabi. (Number of specimens, 10.)
86. (*h.*) Kaki-awase. Class VIII. Mixture or Kuro-Shunkei (black Shunkei). (Number of specimens, 2.)
87. (*i.*) Aka-Shunkei. Class IX. Red Shunkei. (Number of specimens, 2.)
88. (*j.*) Kijiro. Colour of the grain of wood. (Number of specimens, 14.)
89. (*k.*) Red and coloured lacquers—
    1. Coating of red lacquer ground down with magnolia charcoal.
    2. Pattern applied in black lacquer and gold.
    3. Coating of transparent lacquer applied.
    4. Finally polished.
    5. Best. 5 A. Second best.
    6. " 6 A. "
    7. " 7 A. "
    8. " 8 A. "
    9. " 9 A. "
    The same colours being used.
90. Shu. Vermilion.
91. Seisbitsu. Green.
92. Kiō. Chrome yellow.
93. Bero-ai. Prussian blue.
94. Murasaki-ko. Purple powder.
95. White lead.
96. Tō-beni. Magenta roseine.
97. Benigara. Red oxide of iron.

---

98. Neji-fude. Brushes of rat's-hair. (Number of specimens, 2.)
99. U-no-ke-nsuji fude. Fine brushes made of hare's-hair. (2 specimens sent of each size.)
100. Ji-nuri-fude. Grounding brushes of hare's-hair. Five sizes. (2 specimens sent of each size.)
101. U-no-ke-bake. Flat brush of hare's-hair. (2 specimens sent.)
102. Mensō. Stiff brush of deers' hair. (2 specimens sent.)
103. Haké. Flat brushes of human hair. (2 specimens sent.)
104. Bun-mawashi. Compass, with brush attached.
105. Kébō. Brushes made of horse-hair. (6 specimens sent.)
106. Fude-kake. Brush-rest.
107. Fude-arai. Brush-cleaner.

344

108. **Goma-abura.** *Sesamum orientalis* oil.
109. **Fude-ire.** Brush-case.
110. { **Tiutsu.** Quills (three sizes).
     { „ Bamboo-tubes (three sizes).
111. **Saji.** Spoon.
112. **Hirame-fude.** Used in affixing hirame, &c. (2 specimens sent.)
113. **Kujira-bera.** Whalebone spatula. (2 specimens sent.)
114. **Hera.** Spatulas of Hinoki. Used for lacquer and sabi. (3 specimens of each sent.)
115. **The tooth of a fish.** Used for polishing.
116. **A piece of polished shell.** Used for smoothing paper.
117. **Tsume-ban.** Palette. (2 specimens sent.)
118. **Take-ban.** Small bamboo board.
119. **Fun-bako.** Flat lacquered box, for holding gold-dust.
120. **Tsubaki-sumi.** Camellia charcoal.
120 A. Camellia charcoal-powder.
121. Shiō. Gomboge.
122. **Ye abura.** *Perilla ocymoides* oil.
123. Specimen board, containing 110 samples of yasuri-ko, hirame, nashiji and sundry colours, &c.
124. Tin-nashiji.
125. Tin-dust.
125 A. Burnt tin-dust.
126. Specimen of Togidashi. Branch of a lacquer tree—
    1 and 2. Showing outline and veining.
    3. Powdering of gold-dust.
    4. Application of second coating of rō-sé.
    5. Coating of Rō.
    6. Same, ground roughly with magnolia charcoal.
    7. Second coating of Rō to the finish.
127. Specimen of Togidashi. Water and clouds—
    1 to 3. Outline, veining and powdering with yasuri-ko and hirame.
    4. Application second coating of rō-sé.
    5. Coating of Rō.
    6. Same, ground roughly with magnolia charcoal.
128. Specimen of Togidashi on Tagayasan. Branch of rose—
    1. Outline of pattern.
    2. Veining.
    3. Powdering of gold-dust.
    4. Coating of Rō-sé.
    5. Coating of transparent lacquer.
    6. Ground down with magnolia charcoal.
    7. Second coating of transparent lacquer.
    8. Again ground with magnolia charcoal.
    9. Thin coating of transparent lacquer applied with cotton wool.
    10. Polished with tonoko and deer's-horn.
    11. Thin coating of yoshino lacquer.
    12. Polished with deer's-horn ashes.
    13 and 14. Repetition of 11 and 12.
129. Specimen of Hiramakiye. Flat lacquer on Shitan (bamboo)—
    1. Outline of pattern.
    2. Pattern filled in with Shitimaki lacquer.
    3. Powdered with gold.
    4. Coating of Yoshino lacquer.
    5. Ground with camellia charcoal.
    6. Polished with whetstone-powder and oil.
    7. Veining drawn in Ke-uchi lacquer.
    8. Same, powdered with gold.
    9. Thin coating of Yoshino lacquer.
    10. Polished with powdered-whetstone and oil.
    11. Thin coating of Yoshino-nobe lacquer and water.
    12. Polished with whetstone-powder and oil.
130. Specimen of Takamakiye. Raised gold lacquer over clouded Togidashi—
    1. Corresponding with No. 6 of Togidashi. (Specimen Nos. 126 and 127.)
    2. Second coating of Rō.
    3. Ground down with magnolia charcoal.
    4. Polished with Tonoko and camellia charcoal.
    5. Polished with deer's-horn ashes, after a coating of Yoshino lacquer.



6. Camellia charcoal powder dusted over a coating of Shitamaki lacquer.
7. Coating of Takamaki lacquer over two applications of Yoshino-nobe lacquer.
8. Same, ground with magnolia charcoal, and partly polished with camellia charcoal.
9. Polished with Tonoko and oil.
10. Application of Keshi-fun over Shitamaki lacquer.
11. Application of Komaka-me-nijin over Shitamaki lacquer.
12. Coating of Yoshino lacquer.
13. Polished with powdered-whetstone and oil.
14. Final polishings. Nos. 12 and 13 repeated three times.

130 A. Paper pattern used for producing above, with lacquer tracing on back, together with the other paper patterns used—
1. Specimen of prepared paper used for tracing patterns.
2. Specimen of soft paper used for rubbing-off the thin coats of lacquer.

131. Specimen of Takamakiye on plain black ground. Branch of lacquer tree—
1. First tracing.
2. Coating of Shitamaki lacquer and charcoal-powder; two coats of Yoshino-nobe lacquer. Afterwards ground smooth with magnolia charcoal.
3. Coating of Takamaki lacquer.
4. Ground with magnolia charcoal, and polished with Tonoko and oil.
5. Gold-dust sprinkled over a coating of Shitamaki lacquer.
6. A coating of Yoshino-nobe lacquer.
7. Ground with camellia charcoal and polished with powdered-whetstone and oil.
8. Veining, and subsequent polishing three times.

132. Specimen of raised lacquer, with and without subsequent gilding. Branch of fir-tree and creeper—
(The marking on the background is meant to imitate the surface of metal attacked by verdigris.)
1. Outline drawn and sprinkled with charcoal-dust.
2. Spikes of fir-tree, finished in Hira-makiye.
3. Three applications of Shitamaki lacquer and charcoal-powder, afterwards polished.
4. Coating of Takimaki lacquer, polished with camellia charcoal-powder and Tonoko.
5. Leaves powdered with gold, over a coating of Shitamaki lacquer.
6. Coating of Yoshino-nobe lacquer, afterwards ground with camellia charcoal, and polished with powdered whetstone and oil.
7. Finished branch of tree made of several coats of Sabi lacquer.
8. One finished leaf, showing application of Kiri-kane; and one finished leaf showing method of shading with vermilion.

133. Specimen of raised gold lacquer on plain wood (branch and blossom of cherry). The very bright portions are in thin gold-foil (Kimetsuke).

134. Finished specimens of Giyōbu-nashiji of mixed gold and shell work, and of pattern for a border.

135. Specimen of lacquering on metal.

136. Tray showing process of applying Nashiji—
1. Pure gold Nashiji.
2. Koban gold Nashiji.
3. Silver Nashiji. Back of tray silver Nashiji.
4. Tin Nashiji.
5. Coating of transparent lacquer.
6. Ground roughly with magnolia charcoal.
7. Second coating of transparent lacquer.
8. Ground smooth with magnolia charcoal.
9. Transparent lacquer applied with cotton-wool.
10. Polished with powdered charcoal and tonoko.
11. Thin coating of Yoshino lacquer.
12. Polished with deer's-horn ashes and oil.
13. Second thin coating of Yoshino lacquer.
14. Polished with deer's-horn ashes and oil.

136 A. Specimen of common tin Nashiji.

137. Finished specimen of Togidashi. Peacock's feather.

138. Box showing various modes of applying Kiri-kane, Awo-gai, Hirame, and shading colours to produce patterns (unfinished).

139. Similar kind of box (finished).
140. Specimen of inlaying work: in coral, various shells, deer's-horn, &c.—
1. Hirame applied over Rō-sé.
2. Shell-work, &c., having been applied, three coats of Sabi have been given, and then ground smooth.
3. Coating of Rō lacquer.
4. Same, ground down with magnolia charcoal.
5. Second coating of Rō lacquer, same ground away with magnolia charcoal and polished with Tonoko and oil.
6. A coating of branch lacquer, afterwards polished off with deer's-horn ashes and oil.
7. Hirame. Polished after lacquering.
8. The whole of the inlaid work polished and the veining of the leaves completed; bottom of tray in silver Nashiji.
141. Stand for wine cup in Togidashi. Kioto work. About fifty years old.
142. Inrō. Medicine-box in Takamakiye, with dead gold ground, showing application of Kuma (shading lacquer). Tōkiō work. About twenty-five years old.
143. Inrō. Medicine-box, showing application of hirame. Tōkiō work. Estimated at over one hundred years old.
144. Inrō. Medicine-box, showing method of shading, &c. Tōkiō work. About eighty to one hundred years old.
145. Tray. Inlaid shell-work. Kioto work. Estimated age, one hundred and twenty years.
146. Tray. Negoro ware. *Vide* Pamphlet, pp. 10-11. Over fifty years old.
147. Medicine-box of Tsuishu. *Vide* Pamphlet, p. 16. Estimated over fifty years old.
148. Box of Tsui-koku. Carved black lacquer. *Vide* Pamphlet, p. 16. Estimated age, over one hundred years.
149. Two boxes of the style called "Guri." *Vide* Pamphlet, p. 16. Estimated age, over fifty years.
150. Writing-box, style called "Cho-moku." *Vide* Pamphlet, p. 9. Estimated age, seventy to eighty years.
151. Wine-cup. Kioto work. Red and yellow lacquer. Gilt inside. Estimated age, over fifty years.
152. Soup or rice-bowl. Nambu ware. *Vide* Pamphlet, p. 10. Estimated age, over seventy years.
153. Round tray. Loo-choo red lacquer.
154. Paper tray lacquered over. Tōkiō work
155. Specimen boards, showing design on red lacquer, in gold, and rō-sé, through transparent lacquer. Tōkiō work.
156. Food-box of Wakasa lacquer. *Vide* Pamphlet, p. 13.
157. Cabinet of Tsugaru-nishiki lacquer.
158. Tray of ordinary Tsugaru lacquer.
159. Box of Tsugaru lacquer over paper. *Vide* Pamphlet, p. 13.
160. Tray of Akita-noshiro lacquer. *Vide* Pamphlet, p. 12.
161. Round tray. Chinkin-bori. Made at Kaga. Also, rice-bowl. *Vide* Pamphlet, p. 17.
162. Square trays. Made at Wojima. *Vide* Pamphlet, pp. 14 and 17.
163. Sweetmeat bowl. Made at Wajima. *Vide* Pamphlet, p. 14.
164. Small round trays of Kaga lacquer.
165. Toothbrush-box of Suruga lacquer, showing grain of the wood. *Vide* Pamphlet, p. 16.
166. (*a.*) Food-box. Black Aidzu-ware.
(*b.*) Rice-bowl. Yellow ditto.
(*c.*) ,, Green ditto.
(*d.*) Tray. Red and green ditto.
(*e.*) ,, Yellow clouded ditto.
(*f.*) Rice-bowl. Reddish brown ditto.
167. 1 square and 1 round tray of new Nikkō-ware.
168. Food-box. Red Shunkei.
169. Square tray. Ditto.
170. Rice-box. Commonest red Shunkei. Made in Province of Shinano.
